

CLAIMS

1. A spin-valve transistor comprising an emitter (E),
a base (B) and a collector (C), the emitter (E)
5 being made of a semiconductor material, the base
comprising three successive metal layers, the
first layer (F1) and the third layer (F2) being
ferromagnetic, the second layer (N) not being
ferromagnetic, the interface between the emitter
10 (E) and the layers of the base (B) forming a
Schottky diode, characterized in that the
collector (C) is metallic and separated from the
base (B) by a thin insulating layer (I) of
approximately a few nanometers, said layer forming
15 a tunnel-effect barrier between the base (B) and
said collector (C).
2. The spin-valve transistor as claimed in claim 1,
characterized in that the insulating layer (I)
20 presents a lower-level potential barrier than the
potential barrier of the Schottky diode existing
between the emitter (E) and the base (B).
3. The spin-valve transistor as claimed in claim 2,
25 characterized in that the insulating layer (I) is
made of tantalum oxide or of zinc sulfide or of
zirconium oxide or of a rare earth oxide such as
yttrium oxide.
- 30 4. The spin-valve transistor as claimed in claim 1,
characterized in that the insulating layer (I) has
a thickness of approximately between 1 and
4 nanometers.
- 35 5. The spin-valve transistor as claimed in claim 1,
characterized in that the emitter (E) comprises at
least one layer of semiconductor material and the
collector (C) at least a first layer of metallic
material.

6. The spin-valve transistor as claimed in claim 4,
characterized in that the layer of semiconductor
material of the emitter (E) comprises at least a
5 second layer of metallic material (A).
7. The spin-valve transistor as claimed in claims 4
and 5, characterized in that electrical connection
means (C_E , C_B and C_C) are implanted on the level of
10 the first layer of metallic material, on the level
of the second layer of metallic material and of
any one of the layers ($F1$, N , $F2$) of the base,
said connection means being used to apply external
voltages and currents to the transistor.
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8. The spin-valve transistor as claimed in claim 1,
characterized in that the electrical voltage
applied between the emitter (E) and the base (B)
via the connection means (C_E) and (C_B) is greater
20 than the potential barrier of the insulating layer
(I).